Before the
Federal Communications Commission
Washington, D.C. 20554

PR Docket No. 93-199

In the matter of

Amendment of Part 87 of the Commission's Rules to implement technical requirements applicable to instrument landing system receivers and VHF Omnirange Radio receivers adopted by the International Civil Aviation Organization. RM-7610

NOTICE OF PROPOSED RULE MAKING

Adopted: June 24, 1993; Released: July 14, 1993

Comment Date: September 27, 1993
Reply Comment Date: October 27, 1993

By the Commission:

I. INTRODUCTION

1. This *Notice of Proposed Rule Making (NPRM)* proposes to implement new technical specifications contained in the Convention on International Civil Aviation (Convention)[1] for Instrument Landing System (ILS)[2] and VHF Omnirange Radio (VOR)[3] receivers on board U.S. aircraft. The proposed technical standards are consistent with the Convention and would improve the immunity of aircraft ILS and VOR receivers to interference.

II. BACKGROUND

2. The issue of compatibility between the FM broadcast service and the aeronautical mobile service has been a concern for many years.[4] In 1979, the World Administrative Radio Conference of the International Telecommunication Union (WARC-79) recommended that the International Radio Consultative Committee (CCIR) study the problem of interference between the FM broadcasting service and the aeronautical service. WARC-79 also invited the International Civil Aviation Organization (ICAO) to study the problem and communicate its findings and conclusions to CCIR.[5] In 1982, CCIR issued a report on compatibility between the two services. The pertinent general recommendation of this report was:

> It is a highly desirable aim that standard airborne ILS, VOR, and VHF [radiotelephone] system characteristics be developed with respect to the rejection of unwanted signals outside the aeronautical band.[6]

3. In 1985, ICAO promulgated technical standards for ILS and VOR receivers.[7] Under the standards, ILS and VOR receivers are to be designed to provide greater immunity to interference from two signal, third-order intermodulation products caused by VHF FM broadcast signals. ILS and VOR receivers are also to be designed with greater immunity to desensitization in the presence of strong VHF FM broadcasting signals. The ICAO timetable calls for these standards to apply to all ILS and VOR receivers installed after January 1, 1995, and to all ILS and VOR receivers in aircraft engaged in international flight after January 1, 1998.[8]

4. On December 21, 1990, we received a Petition for Rule Making from John F. Furr and Associates, asking the Commission to study and adopt appropriate technical stan-

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[1] 61 Stat. 1180, T.I.A.S. 1591.

[2] ILS is a precision landing system that allows aircraft to land under low cloud ceilings and in poor visibility. It has two components, a localizer and a glide path indicator. The localizer transmits signals in the 108-118 MHz band that provide the pilot with course guidance to the centerline of the runway. The glide path indicator operates in the 329-335 MHz band, transmitting descent information to the aircraft as it approaches the runway. The combination of the localizer and the glide path indicator allow the pilot to determine both the centerline of the runway and the proper rate of descent to land safely. Federal Aviation Administration, *Airman's Information Manual* 1-1-8 (1991).

[3] VOR is a system that transmits two radio signals in the 108-118 MHz band from ground stations to an aircraft. The phase of the two signals relative to each other varies depending on the direction of the aircraft receiver from the ground station. VOR equipment on board the aircraft interprets the phase relationship of the two signals and informs the pilot of the direction to the VOR transmitter. Signals received from two VOR transmitters can be used to determine the position of the aircraft. *Id.*

[4] The portion of the radio spectrum from 108-137 MHz is allocated to the aeronautical mobile service, and is used for various types of aeronautical communications, including ILS and VOR systems. The portion of the radio spectrum from 88-108 MHz is allocated to VHF FM broadcasting. *See* 47 C.F.R. § 2.106. Because these two spectrum bands are adjacent, and because VHF FM broadcast transmitters are typically much more powerful than ILS and VOR transmitters, there is a potential for interference to ILS and VOR operations. Two types of interference to ILS and VOR systems are of greatest concern: intermodulation and receiver desensitization. Intermodulation interference may occur when two RF signals, neither of which would cause interference by itself, are received and the interaction between these signals in the aircraft ILS and VOR receiver degrades the reception of the ILS and VOR signal. Receiver desensitization may occur when a strong RF signal causes the receiver to not detect low level ILS and VOR signals. Currently, the Commission addresses potential interference problems by imposing special operating conditions on FM licenses, by requiring site, power, antenna height or frequency changes, or by some combination of the above.

[5] Radio Regulations REC 705-1 (1979).

[6] Report 929, "Compatibility Between the Broadcasting Service in the Band of About 87-108 MHz and the Aeronautical Services in the Band 108-136 MHz," VII Recommendations and Reports of the CCIR 1982 786, 796 (1982).

[7] ICAO Convention, 61 Stat. 1180, T.I.A.S. No. 1591, Annex 10, v. I, ¶ ¶ 3.1.4, 3.3.8 (1985) (ICAO).

[8] *Id.*

dards for "avionics," *i.e.*, ILS and VOR receivers. In this petition, John F. Furr and Associates requested that we establish standards for ILS and VOR receivers that would ensure reliable service.[9] The petition did not propose any specific standards. The primary argument advanced by the petition was that the burden on VHF FM broadcasters of complying with limitations imposed to prevent interference with ILS and VOR receivers is unnecessarily onerous and that adopting improved interference immunity standards for aviation receivers would alleviate this burden.[10] Eighteen comments were filed by the parties listed in Appendix A. Sixteen of these, filed by various groups, support the idea of establishing such standards, and five of these suggest the ICAO standards. Two comments oppose the adoption of standards more stringent than the ICAO standards,[11] claiming that the ICAO standards are sufficient to ensure public safety. Aeronautical Radio, Inc. and the Air Transport Association also question the Commission's authority to impose technical standards for ILS and VOR receivers.[12] Because the petition and comments address the issue of ILS and VOR standards we are including them in this proceeding.

III. DISCUSSION

5. Almost all commercial aircraft and many general aviation aircraft are equipped with ILS and VOR systems. These aids to air navigation are an integral part of modern aviation, improving the ability of aircraft to navigate in poor weather. The use of these systems greatly increases the reliability, safety, and efficiency of aviation.

6. After careful consideration of this matter we therefore are proposing to adopt standards for ILS and VOR receivers and the deadlines for meeting the standards as set forth by ICAO. ILS and VOR receivers installed after January 1, 1995, would have to comply with the ICAO standards, and after January 1, 1998, all ILS and VOR receivers, regardless of installation date, would have to comply with the standards. This action would fulfill the United States' obligation as a signatory to the Convention. In addition, the proposed standards would increase the safety of international flight by minimizing the likelihood of interference to ILS and VOR systems. The increased immunity of ILS and VOR receivers to interference is especially important because other countries will assume that the ICAO standards are being complied with and will regulate VHF FM broadcasting stations accordingly. If U.S. aircraft flying internationally are not equipped to ICAO standards by 1998, the probability that they will encounter disabling interference in other countries increases. Finally, the aviation community has signalled acceptance of the ICAO standards. For example, RTCA,[13] which develops Minimum Operational Performance Standards (MOPS) for aviation systems, incorporated the ICAO standards into its MOPS for ILS and VOR receivers in 1986.[14] The Federal Aviation Administration (FAA) refers to these MOPS in its Technical Service Orders (TSOs)[15] and currently requires ILS and VOR receivers that do not meet the new ICAO technical standards be identified by reference to older TSOs on equipment labels.[16] In 1990, Aeronautical Radio, Inc. (ARINC), which provides aviation communications services, applied the ICAO standards for interference immunity in a document setting forth the desired characteristics of new ILS receivers.[17]

7. We note that the Commission has express authority to implement the Convention's requirements.[18] In this regard, because the Convention applies to international flights the new standards technically apply only to ILS and VOR receivers on board aircraft that fly internationally. We tentatively conclude, however, that applying the ICAO standards to domestic aircraft is necessary to further the overriding objective of the ICAO Convention, Article 44(h), to "promote safety of flight in international aviation." In this instance, it appears that the international air safety objective would be thwarted if domestic aircraft could not receive adequate landing instructions due to interference with VHF FM broadcasting signals and international aircraft in close proximity were endangered. This safety objective could also be undermined if a domestic aircraft had to land in a neighboring country in an emergency and could not receive adequate landing instructions due to interference. Accordingly, we propose to exercise our ancilliary jurisdiction and apply the ICAO standards to domestic aircraft as well as international aircraft in order to fully accomplish the Convention's purposes,[19] and to promote the safety of life and property.

8. To reduce the economic impact of this proposal on the general aviation community, we are proposing to allow ILS and VOR receivers installed before January 1, 1995, in aircraft that fly only domestically an additional seven years, until January 1, 2005, before they must comply with the ICAO standards.[20] In the interests of aeronautical safety,

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[9] John F. Furr and Associates, *Petition for Rulemaking* 4 (1990).

[10] John F. Furr and Associates, *Petition for Rulemaking* 3-5 (1990).

[11] Comments by National Business Aircraft Association (March 7, 1991), Comments by Aeronautical Radio, Inc. and the Air Transport Association of America 2-4 (March 11, 1991).

[12] Comments of Aeronautical Radio, Inc. and the Air Transport Association of America 2-3 (March 11, 1993).

[13] RTCA is an association of aeronautical organizations of the United States from both government and industry. RTCA seeks technical solutions to problems involving the application of electronics and telecommunications to aeronautical operations. The findings of RTCA are in the nature of recommendations to all organizations concerned. While RTCA is not a government agency, its findings and recommendations are often adopted by government agencies in forming aviation policy. *See, e.g.*, RTCA, *RTCA/DO-195* i (1986).

[14] RTCA, *Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating Within the Radio Frequency Range of 108-112 Megahertz* 10-15 (1986) (RTCA DO-195), RTCA, *Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating Within the Radio Frequency Range of 108-117.5 Megahertz* 9-13 (1986) (RTCA DO-196).

[15] Federal Aviation Administration, *Technical Service Orders C-36e, C-40c* (1988).

[16] *Id.*

[17] Aeronautical Radio, Inc., *ARINC Characteristic 710-9, Mark 2 Airborne ILS Receiver* 6-7 (1990).

[18] 47 U.S.C. § 303(r) (authority to implement international radio or wire communications treaties or conventions).

[19] *See* 47 U.S.C. §§ 151, 152(a), 154(i), 303(r); *United States v. Southwestern Cable Co.*, 392 U.S. 157, 178 (1968).

[20] Providing an extended compliance period for domestic general aviation is consistent with our past practice of reducing the financial burden of general aviation compliance with new standards. *See*, Report and Order, 6 FCC Rcd. 4692 (1991) (FCC 91-216, providing a "grandfather" clause for VHF aircraft transmitters).

however, we propose to require aircraft flying domestically under Instrument Flight Rules (IFR) to comply with the ICAO standards after January 1, 1998, to ensure that aircraft landing by ILS are all equipped with equally protected receivers. We are also proposing to require that all ILS and VOR receivers manufactured in or imported into the United States after January 1, 1994, meet the ICAO standards. This requirement is designed to encourage installation of ILS and VOR receivers meeting ICAO standards as soon as possible. Vendors of ILS and VOR receivers will still have until January 1, 1995, to exhaust current stocks of receivers which do not meet ICAO standards. This will encourage vendors to stock receivers meeting the ICAO standards as soon as possible. In this manner, we are attempting to avoid an economic burden to vendors of ILS and VOR receivers.

9. In summary, we propose to implement the ICAO standards for all U.S. aircraft according to the following timetable:

January 1, 1994	All ILS and VOR receivers manufactured in or imported into the United States must meet ICAO standards.
January 1, 1995	All newly installed ILS and VOR receivers on board U.S. aircraft must meet ICAO standards.
January 1, 1998	All ILS and VOR receivers on board U.S. aircraft engaged in international flight must meet ICAO standards. Domestically, no aircraft may operate under Instrument Flight Rules unless ILS/VOR receivers meet ICAO standards.
January 1, 2005	All ILS and VOR receivers on board U.S. aircraft must meet ICAO standards.

10. In order to ensure that ILS and VOR receivers meet the new standards, we propose that ILS and VOR receivers be authorized pursuant to the Commission's equipment authorization program. In accordance with our rules, notification is the appropriate method for applying for equipment authorization.[21] Notification is a type of equipment authorization issued by the Commission whereby the applicant makes measurements to determine that the equipment complies with the appropriate technical standards and reports that such measurements have been made and demonstrate the necessary compliance. Submittal of a sample unit or representative data demonstrating compliance is not required unless specifically requested by the Commission.[22] The procedures for application for equipment authorization are contained in Subpart J of Part 2 of our Rules.[23] We propose to use the test procedures defined by RTCA MOPS for ILS and VOR receivers as the basis for applications for equipment authorization.[24]

IV. CONCLUSION

11. We propose to amend the Commission's Rules to adopt interference immunity standards for all ILS and VOR receivers on board U.S. aircraft. The adoption of these standards would increase the safety of international aviation, and meet U.S. obligations under the ICAO Convention.

V. PROCEDURAL MATTERS

Ex Parte Rules - Non-Restricted Proceeding

12. This is a non-restricted notice and comment rulemaking proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. *See generally* 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

Regulatory Flexibility Act

13. As required by Section 603 of the Regulatory Flexibility Act, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the expected impact on small entities of the proposals suggested in this document. The IRFA is set forth in Appendix C. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments on the rest of the Notice, but they must have a separate and distinct heading designating them as responses to the Initial Regulatory Flexibility Analysis. The Secretary shall send a copy of this Notice of Proposed Rule Making, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act. Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. §§ 601 *et seq.* (1981).

Comment Dates

14. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before **September 27, 1993,** and reply comments on or before **October 27, 1993**. To file formally in this proceeding, you must file an original and four copies of all comments, reply comments, and supporting comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You should send comments and reply comments to Office of the Secretary, Federal Communications Commission, Washington, D.C. 21554.

VI. ORDERING CLAUSES

15. This action is taken pursuant to sections 1, 2(a), 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152(a), 154(i), 303(r).

16. IT IS ORDERED that a copy of this *Notice* shall be sent to the Chief Counsel for Advocacy of the Small Business Administration.

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[21] 47 C.F.R. § 15.101(a).
[22] 47 C.F.R. § 2.904.
[23] 47 C.F.R. Part 2, Subpart J.
[24] RTCA DO-195 § 2.4 (1986); RTCA DO-196 § 2.4 (1986) (note 14 *supra*).

17. Questions about this document should be addressed to Marc S. Martin, Room 5114, Private Radio Bureau, Federal Communications Commission, 2025 M Street N.W., Washington DC 20554, telephone (202) 632-7175.

FEDERAL COMMUNICATIONS COMMISSION

William F. Caton
Acting Secretary

APPENDIX A

LIST OF COMMENTERS TO PETITION BY JOHN F. FURR AND ASSOCIATES

John D. Abdnour

Aeronautical Radio, Inc. and Air Transport Association of America

Association of Federal Communications Consulting Engineers

Robert C. Beckham

Capital Cities/ABC, Inc.

CBS, Inc.

Federal Communications Bar Association

Fisher Broadcasting, Inc.

GTE Service Corporation

Grass Roots Radio, Inc.; Guy Gannett Publishing Co., Inc.; King Broadcasting Company; Nationwide Communications Inc. (joint comment)

Lahm Suffa & Cavell, Inc.

Maximum Service Television, Inc.

National Association of Broadcasters

National Business Aircraft Association

National Public Radio

Tschirhart Broadcasting, Inc.

Utilities Telecommunications Council

Walker, Bordelon, Hamlin, Thierot & Hardy

APPENDIX B

PROPOSED RULES

Part 87 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

1. The authority citation for Part 87 continues to read as follows:

AUTHORITY: 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-156, 301-609.

2. New Section 87.144 is added to read as follows:

§ 87.144 Instrument landing system (ILS) and VHF Omnirange Radio (VOR) receiver technical standards.

(a) The standards in paragraphs (b), (c), (d) and (e) of this Section shall apply to ILS and VOR receivers as follows:

(1) After January 1, 1994, to all ILS and VOR receivers manufactured or imported for sale in the United States;

(2) After January 1, 1995, to all newly installed ILS and VOR receivers aboard U.S. aircraft;

(3) After January 1, 1998, to all ILS and VOR receivers aboard U.S. aircraft which fly internationally and U.S. aircraft flying domestically under the Federal Aviation Administration's Instrument Flight Rules; and

(4) After January 1, 2005, to all ILS and VOR receivers aboard U.S. aircraft.

(b) The ILS and VOR receivers must provide adequate immunity from two signal, third-order intermodulation products, caused by VHF FM broadcast signals, having levels in accordance with the following:

(1) for VHF FM sound broadcasting signals in the range 107.7-108.0 MHz,

$$2N_1 + N_2 + 72 < \text{or} = 0$$

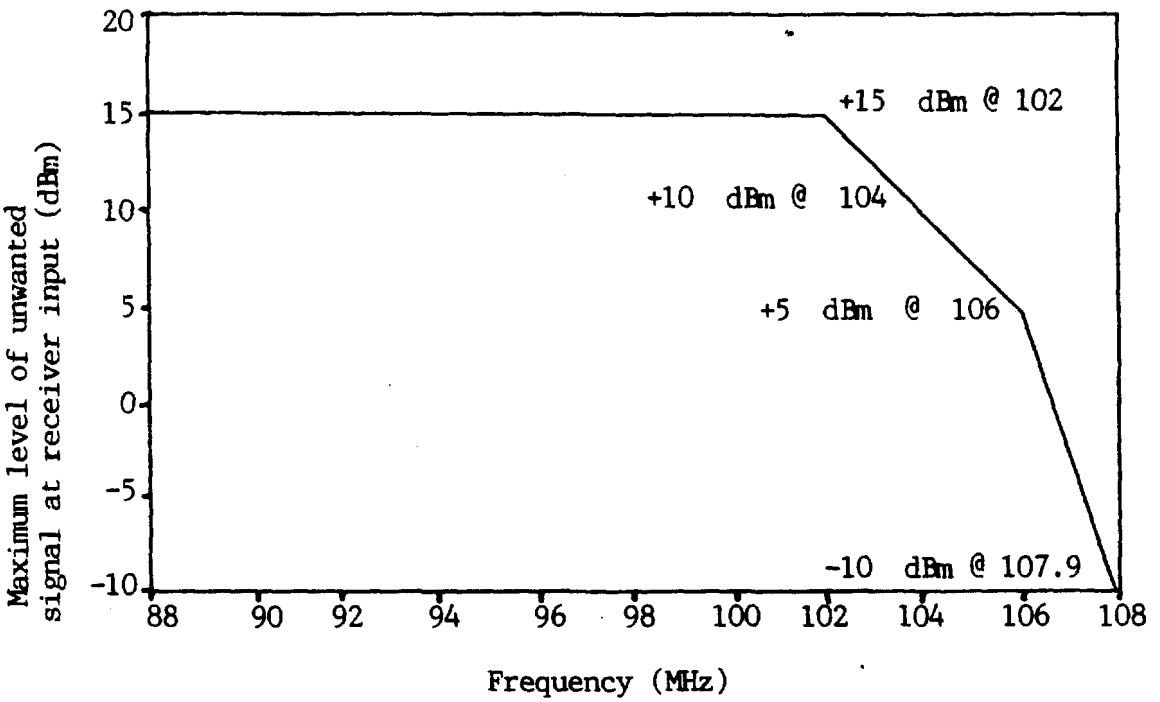
(2) for VHF FM sound broadcasting signals below 107.7 MHz,

$$2N_1 + N_2 + 3[24 - 20 \log(\Delta f/0.4)] < \text{or} = 0$$

where the frequencies of the two VHF FM sound broadcasting signals produce, within the receiver, a two signal, third-order intermodulation product on the desired ILS/VOR localizer frequency.

(3) In these equations, N_1 and N_2 are the levels (dBm) of the two VHF FM sound broadcasting signals at the ILS and VOR receiver input. Neither N_1 nor N_2 should exceed the maximum levels specified in paragraph (c). Δf equals 108.1 - f_1, where f_1 is the frequency of N_1, the VHF FM sound broadcasting signal closer to 108.1 MHz.

(c) The ILS and VOR receivers must not be desensitized in the presence of VHF FM broadcast signals having levels in accordance with the following figure:



(d) Manufacturers of ILS and VOR receivers seeking equipment authorization of these receivers shall test the receivers in accordance with the test procedures contained in the following documents, which are incorporated by reference:

(1) For ILS receivers, RTCA DO-195, "Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating Within the Radio Frequency Range of 108-112 Megahertz," Section 2.4., November 17, 1986.

(2) For VOR receivers, RTCA DO-196, "Minimum Operational Performance Standards for Airborne VOR Localizer Receiving Equipment Operating Within the Radio Frequency Range of 108-117.95 Megahertz," Section 2.4., November 17, 1986.

(e) After January 1, 1995, each newly installed airborne ILS and VOR receiver must be authorized by the Commission for use in these services. An applicant for equipment authorization of ILS or VOR receivers must notify the FAA of the filing of an authorization application. The letter of notification must be mailed to: FAA, Spectrum Engineering Division, 800 Independence Ave. S.W., Washington DC 20591 no later than the date of filing of the application with the Commission.

(1) The notification to the FAA must describe the equipment, give the manufacturer's identification, the frequency or frequencies of operation, and certify that the interference and desensitization immunity characteristics specified in Section 87.144 above are met or exceeded.

(2) The equipment authorization application must include a copy of the notification letter to the FAA. The Commission will not act for 21 days after receipt of the application to afford the FAA an opportunity to comment. If the FAA objects to the application for equipment authorization, it should mail its objection with a showing that the equipment is incompatible with the National Airspace System to: Office of Engineering and Technology Laurel Laboratory, Authorization and Evaluation Division, 7435 Oakland Mills Rd. Columbia, MD 21046. If the Commission receives such an objection, the Commission will consider the FAA showing before taking final action on the application.

APPENDIX C

INITIAL REGULATORY FLEXIBILITY ANALYSIS

Reason for Action

This rule making proceeding is initiated to obtain comment regarding the adoption of International Civil Aviation Organization (ICAO) technical standards for instrument landing system (ILS) and VHF Omnirange Radio (VOR) receivers on board U.S. aircraft.

Objectives

The Commission seeks to implement ICAO technical standards as required by the Convention on International Civil Aviation, to which the United States is signatory. In implementing the ICAO standards for all U.S. aircraft, whether flying internationally or only domestically, the Commission seeks to achieve the objectives of ICAO in mandating the standards and to maximize the safety of international aviation.

Legal Basis

The proposed is authorized under Sections 1, 2(a), 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152(a), 154(i), 303(r).

Reporting, Recordkeeping and Other Compliance Requirements

None for small business entities.

Federal Rules Which Overlap, Duplicate or Conflict With These Rules

None.

Description, Potential Impact, and Number of Small Entities Involved

The rule changes proposed in this proceeding could affect small, general aviation businesses by requiring them to replace current ILS and VOR receivers with ILS and VOR receivers meeting the ICAO standards. After evaluating the comments in this proceeding, the Commission will further examine the impact of any rule changes on small entities and set forth our findings in the Final Regulatory Flexibility Analysis.

Any Significant Alternatives Minimizing the Impact on Small Entities Consistent with the Stated Objectives

The Notice currently proposes an extended compliance period for small entities which fly only domestically, to minimize the impact of the proposed rule changes on such entities. The Commission believes that this is a reasonable compromise between allowing no extension of the compliance period, which would place a heavier economic burden on small entities, and allowing a longer extended compliance period, which would have a detrimental effect on the safety of the public engaged in flight. The Notice solicits comments on alternatives.